Discharge Algorithm Working Group Status Update

Colin Gleason on behalf of:
Mike Durand
Pierre-Andre Garambois
Helene Roux
Dave Bjerklie
Jérôme Monnier
And many others

June 15, 2016

What is the DAWG?

The DAWG is tasked with generating river discharge from SWOT measurements

SDT-hydraulic inversion algorithms- what we now call McFLI (Mass conserved Flow Law Inversion)

The idea here is that SWOT gives partial observations of river flow laws, and mass conservation makes everything simpler

Manning's equation and hydraulic geometry

Principal DAWG activity: “The Pepsi Challenge”

Paper accepted into WRR:
“An intercomparison of remote sensing river discharge estimation algorithms from measurements of river height, width, and slope”

Authors: ST members Durand, Gleason, Garambois, Bjerklie, Smith, Roux, Rodriguez, Bates, Pavelsky, Monnier, Ricci, Schumann, Hossain, and 14 others

Principal DAWG activity: “The Pepsi Challenge”

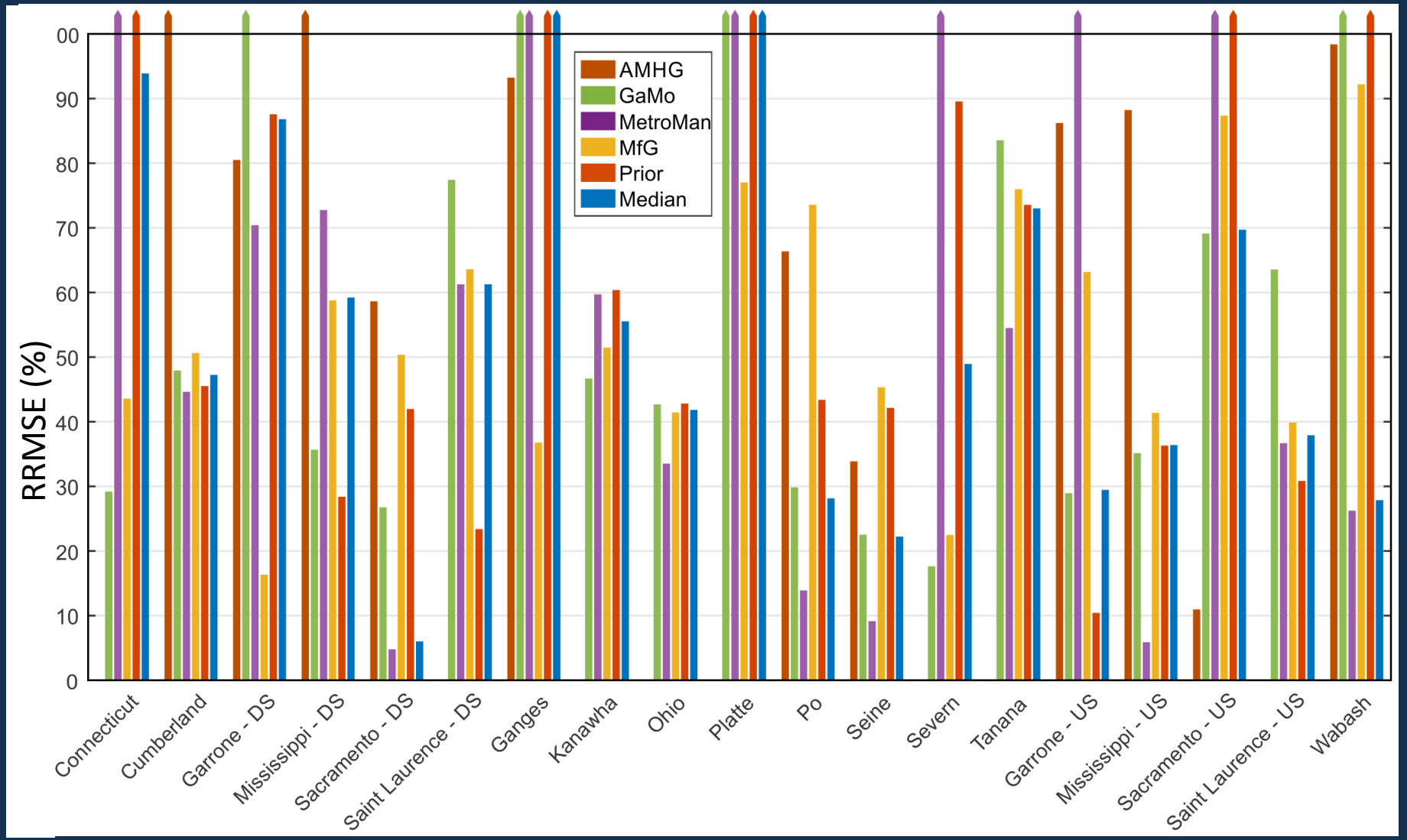
Goal: test different inversion algorithms in a blind ‘taste test’- i.e., an ungauged basin

20 river hydraulic model dataset: width, height, slope. Daily sampling, no error added to measurements

All algorithms forced to use same assumptions (e.g. initial WBM 30 year mean Q, n = 0.03)

No river specific assumptions allowed, no ancillary data allowed: highly restrictive!

The Pepsi Challenge: results
P.A. Garambois at 11:10 today



The Pepsi Challenge: conclusions

One algorithm less than 35% RRMSE for 14/16 non-braided rivers

Errors dominated by bias

Results are encouraging, but work left to be done

We need more data! (more on this in a bit)

What's next for the DAWG

DAWG is now part of RAMADA (River Algorithms, Models And Data Assimilation)

Discussion of next steps from a fluvial perspective tomorrow at 10:00am

Lessons learned from the Pepsi Challenge and next steps- P.A. Garambois at 11:10 today

New members welcomed!!!!!

We need more data!!

To make these algorithms SWOT-ready, we need SWOT like data

AirSWOT data are excellent and currently being analyzed, but we only have 3 cases with relatively few overpasses

Hydraulic models are useful (e.g. Pepsi), but need to be downgraded to SWOT sampling and precision

SWOT simulator-capable datasets desperately needed

DAWG and RAMADA need you!

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If you have the following for any river….

- A calibrated channel hydraulic model
- A floodplain DEM + channel bathymetry
- Distributed in situ measurements of height, width, and slope
- Simulator outputs
- Secret AirSWOT data

WE NEED IT! Contact your favorite of:

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